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C&S

PATENT

Docket No.: M4065.0394/P394

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:
Neo C. Peng

Serial No.: 09/805,111

Filed: March 14, 2001

For: IN-PROCESS TAPE BUR
MONITORING

Conf. No.: 1491

Examiner: Boyer Ashley

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APPELLANT'S BRIEF ON APPEAL

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TECHNOLOGY CENTER R3700

This is an appeal pursuant to 35 U.S.C. § 134 and 37 C.F.R. §§ 1.191 et seq. from the final rejection of claims 1-2, 4-5, and 7-8 of the above-identified application. The fee for submitting this Brief (\$330.00, 37 C.F.R. § 1.17(c)) is attached hereto. Any deficiency in the fees associated with this Brief should be charged to our Deposit Account No. 04-1073. The Notice of Appeal was filed on January 20, 2004. Enclosed with this original are two copies of this brief.

I. Real Party in Interest

The real party in interest in this appeal is Micron Technology, Inc., the assignee of this application.

II. Related Appeals and Interferences

There are no related appeals or interferences known to Appellant, Appellant's legal representative, or the assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. Status of Claims

The application contains claims 1-2, 4-5, and 7-8. Claims 1-2, 4-5, and 8 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Matsushita (European Patent Application No. 0 307 509 B1). Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsushita. Claims 3, 6, and 9-15 are canceled. The claims involved in this appeal are claims 1-2, 4-5, and 7-8.

IV. Status of Amendments

An Amendment was filed on December 17, 2003 (after the mailing of the Final Rejection). The Examiner agreed to enter the Amendment for purposes of appeal. The claims set forth in the Appendix include the changes made by the Amendment filed on December 17, 2003.

V. Summary of Invention

The present invention is directed to a cutting apparatus for removing protective tape from a semiconductor wafer, prior to routing the wafer to a backgrinding process. The cutting apparatus (401) shown in Figs. 7A-7B has a support element for supporting a wafer (Fig. 3, 300) and a cutting element (Figs. 7A-7B, 410) to cut away a portion (325) of protective tape (320). Referring to the Proposed Drawing Correction filed December 17, 2003 and approved in the Advisory Action mailed January 21, 2004, the cutting apparatus further includes a transport mechanism (440) for moving the wafer from the support to a grinding apparatus. The cutting apparatus (401) has a sensor (420) for detecting if the portion (325) of protective tape (320) has been properly removed, and a circuit 430 for initiating corrective action to stop the transport mechanism from moving the wafer to the grinding apparatus when the sensor detects that the protective tape is not properly removed by the cutting element. Application at page 6, line 20 - page 7, line 21.

The use of the sensor (420) and circuit (430) is important because if the cutting process is not properly performed, excess tape, known as tape bur, may be attached to the wafer. If the wafer is then fed to the backgrinder, the excess tape may become folded between the wafer and a portion of the backgrinder. Tape bur can diminish the structural stability of the wafer during backgrinding and result in wafer breakage.

The cutting element (410) is at a predetermined location. In accordance with one embodiment of the invention, the predetermined location is approximately 0.5 mm from the edge of the wafer when the wafer is placed on the support (300). Application at page 7, lines 2 - 3.

VI. Issues

- A. Should the rejection of claims 1-2, 4-5, and 8 under 35 U.S.C. § 102(b) as being anticipated by Matsushita be reversed?
- B. Should the rejection of claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Matsushita be reversed?

VII. Argument

- A. THE SUBJECT MATTER DEFINED IN CLAIMS 1-2, 4-5, AND IS NOT ANTICIPATED BY MATSUSHITA.

Claim 1 recites: "A cutting apparatus comprising ... a sensor for detecting if the portion of the protective tape on a wafer is properly removed by said cutting element ... and a circuit for initiating corrective action to stop the transport mechanism from moving the wafer to the grinding apparatus when the sensor detects that the protective tape is not properly removed from a wafer by said cutting element."

Matsushita discloses an apparatus for cutting tape around a wafer and preventing the wafer itself from being cut. The Examiner contends that either sensor 90 or sensor 110, or a combination of both sensors 90, 110, meets the sensor of claim 1. It should be recognized, however, that Matsushita discloses a sensor which detects the location of wafers and a sensor which detects the location of the cutter. More specifically, with respect to sensor 90, Matsushita discloses at column 8, lines 25-28:

Shown at 90 in Fig. 12 is a photoelectric detector provided on the frame 97. The detector 90 emits light and detects the peripheral edge of the wafer 3 from changes in the reflected light. (emphasis supplied)

Similarly, with respect to sensor 110, Matsushita discloses at column 8, lines 47-50:

A photo electric detector 110 is provided to detect the rotative edge of the shaft 102 to sense deviation of the cutter 105 in the circumferential direction of the wafer 3.
(emphasis supplied)

Although both the wafer and the cutting element must be properly positioned to remove tape bur, these conditions are not sufficient to guarantee that tape bur is removed. Any number of conditions can result in a failure to remove tape bur despite proper positioning. For example, a defective cutting element, or a defective tape which is sufficiently thick to be resistant to cutting may result in a failure to remove tape bur even if the wafer and cutter were properly positioned. Further, neither sensors 90 or 110 of Matsushita are capable of sensing whether tape bur was properly removed during the cutting operation. Matsushita, therefore, fails to disclose or suggest a sensor for detecting whether tape is properly removed.

Claim 1 further recites: "a circuit for initiating corrective action to stop the transport mechanism from moving the wafer to the grinding apparatus when the sensor detects that the protective tape is not properly removed from a wafer by said cutting element." However, as noted above, Matsushita fails to teach or suggest a sensor capable of detecting whether tape has been properly removed. Accordingly, the sensor of Matsushita cannot include a circuit which initiates corrective action when the sensor detects that tape has not been properly removed.

Claim 1 further recites: "a transport mechanism for moving the wafer from support to a grinding apparatus if the portion of the protective tape on the wafer is properly removed." The Office Action alleges that Matsushita discloses the recited transport mechanism in the form of a conveyer belt 120. In fact, conveyer belt 120 is

merely a portion of the transport mechanism disclosed by Matsushita, which further includes drive belts 137-138, and conveyer belts 129-132. See, e.g., Fig. 2; column 12, lines 6-14. The transport mechanism of Matsushita serves to move wafers to a cassette 126 in a unloader 125. Column 12, lines 9-39. While Matsushita discloses a transport mechanism, there is no disclosure or suggestion in Matsushita regarding a transport mechanism which moves wafers to a grinding apparatus. Further, there is no disclosure or suggestion in Matsushita regarding a transport mechanism which moves wafers to a grinding apparatus condition on the requirement that a portion of protective tape on the wafer is properly removed. Matsushita, therefore, also fails to disclose or suggest a transport mechanism for moving a wafer to a grinding apparatus if a portion of protective tape on the wafer is properly removed.

Matsushita fails to disclose or suggest the sensor, circuit, and transport mechanism recited in claim 1. Accordingly, claim 1 is believed to be allowable over the prior art of record. Claims 2, 4-5, and 7-8 depend from claim 1 and are also believed to be allowable for at least the same reasons as claim 1.

Further, claim 4 recites: "wherein the circuit for initiating corrective action prevents a backgrinding apparatus from grinding the wafer." As noted above, Matsushita fails to disclose or suggest the use of a backgrinding apparatus. Matsushita therefore does not disclose or suggest a circuit which can prevent a backgrinding apparatus from grinding a wafer. Accordingly, claim 4 is further believed to be allowable over the prior art of record for this reason.

Claim 8 recites: "wherein the sensor is placed behind the cutting element in a direction of cutting action of said cutting element." As previously stated, the Examiner regards either sensors 90 and 110, or a combination of both sensors 90 and 110 to be equivalent to the claimed sensor. Referring to Figs. 11-12, it can be seen that in Matsushita, both sensors 90 and 110 are not located behind the cutting element in a direction of cutting action of the cutting element, as required by claim 8. Appellants further notes that the combination of both sensors 90 and 110 cannot be equated to the claimed sensor because sensors 90 and 110 are located in different locations, while claim 8 recites a specific location for the recited sensor. Accordingly, claim 8 is further believed to be allowable over the prior art of record for these reasons.

B. THE SUBJECT MATTER DEFINED IN CLAIM 7 IS NOT OBVIOUS OVER MATSUSHITA.

Claim 7 says that the predetermined distance between the support and the cutting element is 0.5 mm. The Examiner offers no support for his conclusion of obviousness. The Examiner merely states that "it has been held that discovering an optimum value as a result effective variable involves only routine skill in the art." Office Action mailed September 17, 2003 at page 3, paragraph 6. Appellant would note, however, that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. MPEP § 2144.05 (II)(B) (MPEP at page 2100-138 (8th Edition, Rev. 1, Feb. 2003)). The Examiner has failed to establish that the Matsushita reference recognized that the first predetermined distance is a result-effective variable. In fact, the Matsushita reference fails to disclose any value, or ranges of values corresponding

to the first predetermined distance, which suggests that Matsushita did not recognize the first predetermined distance as a result-effective variable. Accordingly, the Office Action has not established a prima facie case of obviousness.

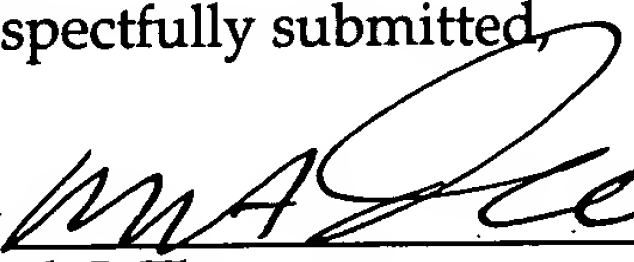
Claim 7 should therefore also be allowable over the prior art of record. Additionally, as noted above, claim 1 should be allowable over the prior art of record. Claim 7 depends from claim 1, should therefore also be allowable for at least the same reasons as stated above with respect to claim 1.

VIII. Conclusion

In Conclusion, Appellant respectfully submits that the Final Rejection of claims 1-2, 4-5, and 7-8 is in error for at least the reasons given above and should, therefore, be reversed.

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Respectfully submitted,

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APPENDIX

Claim 1. An cutting apparatus comprising:

a support for holding a wafer having a protective tape thereon;

a cutting element placed at a first predetermined distance from said support for moving relative to said support to cut a portion of the protective tape from the wafer when the wafer is placed on the support;

a sensor for detecting if the portion of the protective tape on a wafer is properly removed by said cutting element;

a transport mechanism for moving the wafer from support to a grinding apparatus if the portion of the protective tape on the wafer is properly removed; and

a circuit for initiating corrective action to stop the transport mechanism from moving the wafer to the grinding apparatus when the sensor detects that the protective tape is not properly removed from a wafer by said cutting element.

Claim 2. The apparatus of claim 1, wherein the circuit for initiating corrective action stops operation of said cutting apparatus.

Claim 4. The apparatus of claim 1, wherein the circuit for initiating corrective action prevents a backgrinding apparatus from grinding the wafer.

Claim 5. The apparatus of claim 1, wherein the sensor is an mechanical sensor.

Claim 7. The apparatus of claim 1, wherein said first predetermined distance is approximately 0.5 mm from the edge of the wafer when the wafer is placed on said support.

Claim 8. The apparatus of claim 1, wherein the sensor is placed behind the cutting element in a direction of cutting action of said cutting element.